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COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS

GROUP OF EXPERTS ON EXPLOSIVES

Seventeenth session
Geneva

REPORT OF THE GROUP OF EXPERTS ON ITS SEVENTEENTH SESSION

(8-12 August 1977)

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REPORT

1. The Group of Experts on Explosives held its seventeenth session at Geneva from 8 to 12 August 1977. Experts from the following countries participated in its work: Canada; France; Italy; Germany, Federal Republic of; Union of Soviet Socialist Republics; United Kingdom; United States of America. In pursuance of paragraph 7 of Economic and Social Council resolution 2050 (LXII) of 5 May 1977, those countries' members in the Committee of Experts had notified the Secretariat of their intention to participate and vote in the work of the Committee's subsidiary bodies. The Inter-Governmental Maritime Consultative Organization (IMCO), the Central Office for International Railway Transport (OCTI) and the International Civil Aviation Organization (ICAO) also took part in the work of the Group.

ADOPTION OF THE AGENDA

2. The Group adopted the provisional agenda proposed by the Secretariat (ST/SG/AC.10/C.1/R.1) and decided on the order for the discussion of the various items in accordance with a proposal by the expert from the United States of America.

ELECTION OF CHAIRMAN

3. Mr. E.G. WHITEHEAD (United Kingdom) was re-elected Chairman on the proposal of the expert from the United States of America, supported by the experts of the Union of Soviet Socialist Republics, Italy and France. The other experts signified their agreement by acclamation.

PARTICIPATION OF A NON-GOVERNMENTAL ORGANIZATION IN THE WORK OF THE GROUP

4. After consideration of the request submitted in document ST/SG/AC.10/C.1/R.7 by the Association européenne de pyrotechnie (AEP), the Group agreed to the participation of a representative of the Association solely in such of the Group's discussions as related to communications submitted by his Organization.

COMPENDIUM OF RESOLUTIONS ADOPTED BY THE ECONOMIC AND SOCIAL COUNCIL CONCERNING THE TRANSPORT OF DANGEROUS GOODS

5. The expert from the Union of Soviet Socialist Republics proposed that the resolutions on dangerous goods adopted by the Economic and Social Council and listed in the Foreword to the Recommendations (ST/SG/AC.10/1) should be grouped together in a single document and circulated by the Secretariat.

6. That proposal was adopted by the Group, and the Secretariat was requested to give effect to the decision, the Group being agreed that the Secretariat would be free not to include in the compendium the texts of purely incidental resolutions or of resolutions which had ceased to be pertinent.

NEW ENTRIES IN CLASS 1

7. The Group heard a statement by the representative of IMCO explaining the proposals contained in document ST/SG/AC.10/C.1/R.2.

8. The first question discussed by the Group was that of the classification of the diazo salts or compounds referred to in paragraphs 1 to 4 of the IMCO document. After a discussion in which, in particular, the experts from the Federal Republic of Germany, the United States of America and the United Kingdom took part, the Group agreed that diazo salts and possibly diazo compounds having the characteristics of Class 1 should be classified individually in that Class, and also that the Group of Rapporteurs should be requested to consider the question of diazo salts and compounds which might be included in Class 4. A note to that effect, based on a draft prepared jointly by the experts from the United States of America and the United Kingdom, was adopted by the Group for transmission to the Group of Rapporteurs (see annex 1 to this report).

9. The corrections requested by IMCO in paragraph 7 of its document were adopted by the Group, and the Secretariat was requested to incorporate them in the revised edition of the Recommendations now being printed. That decision did not have the effect of closing the discussion on the question of the carriage of trinitroresorcinol (styphnic acid) (C219) in the dry state, which question will, at the suggestion of the expert from the United Kingdom, be considered at the next session.

10. The suggestion in paragraph 3 was adopted, and the expert from the United States of America will prepare a general text introducing chapter 2 of the Recommendations; that text will be submitted for consideration at a future meeting of the Group.

11. Lastly, the correction proposed by IMCO in paragraph 9 was considered to be a matter for the Secretariat, which took note of it for the revised edition of the Recommendations.

12. The Group next considered the proposal by the expert from the Federal Republic of Germany to add to Class 1 isosorbide dinitrate (ISDN), a basic product used in the pharmaceutical industry (ST/SG/AC.10/C.1/R.4). The Group agreed to review the matter in the light of additional information to be provided by the expert from the Federal Republic of Germany. At the end of the discussion the Group took the view that the information sheet reproduced in annex 13 to the Committee's report on its ninth session (ST/SG/AC.10/2) should be modified as necessary so that known data relevant to the possible assignment of substances or articles to Class 1 could be included in it.

13. The Group considered the proposals by the expert from the United States of America, as set forth in section I (a), (b), (c) and (d) and section VII (1) of document ST/SG/AC.10/C.1/R.6, concerning new entries in Class 1.

14. It was agreed to add to the list the six items in section I, paragraph (a) without any reference to a "special provision", the proposal at the end of the paragraph for a special provision being thereby disposed of.

15. The addition proposed in paragraph (b) was not adopted, the Group having agreed to revert to the question of a new description for "Boosters (mines)", the present wording of which in paragraph 4.60 of the Recommendations relates only to articles of this kind used for military purposes. The extension to include articles of a commercial nature will be linked to the method of packing.

16. The Group finally took the view that it would also be desirable to revert to the question of the entries, and it agreed to amend entries 0042, 0225, 0268 and 0283 and the present description (see annexes 2 and 4 to this report), and to replace packing method E 107 by an amended method, also numbered E 107, applicable to items 0042 and 0283 (see annex 3 to this report).

17. The first two substances referred to in paragraph (c) will be added to the list; dipicryl sulphide with the reservation that retention of the reference to special provision 15 is subject to consideration by the Group of Rapporteurs of the possible toxicity of this substance; and ammonium perchlorate, as proposed.

18. The proposal concerning fusees, rail and highway, was withdrawn by its sponsor.

19. The expert from the United States of America stated that the proposal submitted under (d), which was in essence a proposal to establish a list of substances and articles whose carriage was prohibited, could be dealt with in the context of an introduction to chapter 2 of the Recommendations. The opinions both of the experts and of the representatives of the international organizations concerned had stressed the innovatory character of the proposal, which implied a change in the principle hitherto followed by reason of recommendation 1.30 and would make it impossible to reach a constructive conclusion. The expert from the United States of America withdrew his proposal, which he would review in the light of the opinions expressed.

20. It emerged from the consideration of section VII, paragraph (m), that part of the problem could be solved, without adding new items to the list itself, by a judicious use of the index; the experts from the United States of America and the United Kingdom applied themselves to doing so (see annex 2 to this report).

21. However, as that method had been found inapplicable to the rest of the problem, the proposal made was that two new entries should be established for "Flares, aerial", i.e. numbers 0403 and 0404, and that a reference to "Flares, aeroplane" should be inserted in the index. A new entry was also established for "Flares, signal" (0405) (see annex 2 to this report).

22. In view of the question's close connexion with the index, the Group took the view that the question raised in section VII, paragraph (l), would be solved by deleting from the English version of the index the line "Caps, toy, see 0022", which had been retained by mistake although 0022 had been deleted from the list. The Secretariat will make this deletion in the revised version being printed.

23. Finally, the last question raised in document ST/SG/AC.10/C.1/R.6, i.e. that dealt with in section VII (m), was settled by an insertion in the index referring to a series of entries.

24. All the provisions adopted by the Group with respect to the list will be found in annex 2 to this report. */

ADDITIONS TO PACKING SHEETS

25. The Group considered those sections of the paper submitted by the expert from the United States of America (ST/SG/AC.10/C.1/R.6) which concerned packagings.

26. In accordance with the proposal made under section I (b), a new packing sheet E 107 was adopted, as mentioned in paragraph 16 above.

27. In addition, the proposal in section V was accepted and adopted in the form indicated in annex 3 to this report, i.e. by an addition to paragraph 10.2 of the Recommendations.

28. Lastly, the Group felt it necessary to make it quite clear, wherever the sheets recommended prevention of movement, that the reference was to "significant" movement.

29. The provisions and amendments concerning packing are reproduced in annex 3 to this report.

30. The expert from the United States of America drew the attention of the Group to the fact that the last of the requirements for ensuring the waterproofness of bags made of plastics fabrics (type 5HIC) was impracticable. The Group took the view - particularly after the explanations provided by the expert from Italy, who had proposed the insertion of the requirements concerning these bags in the Recommendations - that the provisions under 5HIC should be the same, so far as the specifications were concerned, as those applicable to textile bags of type 5LIC.

31. The Group of Experts requested the Group of Rapporteurs to consider whether the provisions criticized should be amended on those lines.

32. The Group examined a conference room paper, submitted by the expert from the United Kingdom, concerning the packing of black powder (gunpowder) and seeking acceptance of the use of cotton bags as an inner packaging. The proposal was withdrawn, the matter being already covered by the existing provisions.

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*/ Note by the Secretariat: The corrections referred to in paragraphs 9, 11, 22, 34, 37, 40 and 41 of this report have not been reproduced in this annex. They have been communicated by the Secretariat to the Printing Section, which has incorporated them in the proofs of the English and French versions. The same procedure has been adopted for the amendments made to the French text of certain entries.

TECHNICAL AND EDITORIAL REVISION OF THE RECOMMENDATIONS

33. The Group considered the document submitted by the expert from the Federal Republic of Germany (ST/SG/AC.10/C.1/R.5). The Group agreed, as proposed, to the deletion of entry 0088. After a discussion on paragraph 2.2 it became apparent that all the descriptions in chapter 4 of the Recommendations should be recast. In the circumstances, the expert from the Federal Republic of Germany withdrew the proposals in paragraphs 2.2 and 2.3 of his document.

34. The expert from the United Kingdom raised a number of questions concerning minor corrections to be made to the text of the Recommendations. The expert from the Union of Soviet Socialist Republics recalled the proposals contained in document E/CN.2/CONF.5/R.611, annex 2, which also contained some proposed editorial corrections to be made to the text of chapters 2 and 3 of the Recommendations. Those corrections will be taken into account by the Secretariat in the revised edition (paragraphs 4.11, 13.5 and 13.17).

35. In addition, at the suggestion of the United Kingdom expert the Group instructed a small group to undertake a rearrangement of the first few paragraphs of chapter 4. The work of the small group is the subject of document ST/SG/AC.10/C.1/R.8, which will be considered at the Group's next session.

36. The Group examined the parts of document ST/SG/AC.10/C.1/R.6, submitted by the expert from the United States of America, which related to the agenda item concerned.

37. The proposals made in section VI (b), subparagraphs (i), (ii), (iii) and (v), were adopted; since they are solely concerned with matters of drafting, the Secretariat was requested to take them into account in the revised editions currently printing.

38. The proposal made in section VII, paragraph (a), gave rise to a discussion on the extent to which the Group could make changes in the revised editions currently printing without waiting for the Committee's approval.

39. A first reading made it clear that the question raised in the document submitted by the expert from the United States of America, and those raised in annex 2 to document E/CN.2/CONF.5/R.611 submitted by the expert from the Union of Soviet Socialist Republics, did not raise any questions of substance and were of the kind with which the Secretariat frequently had occasion to deal.

40. Suggestions by the Secretariat to settle those points were adopted and the Secretariat was requested to incorporate the corrections adopted in the revised edition currently printing (the purpose of those corrections being to eliminate redundant notes from chapter 3 of the Recommendations).

41. The proposals made in section VII (c) of the document submitted by the expert from the United States of America were adopted and the Secretariat will take them into account in the revised edition being prepared.

WATER-WETTED EXPLOSIVES

42. A single communication had been submitted on this subject (ST/SG/AC.10/C.1/R.6, section IV), seeking the Group's view on the carriage of water-wetted explosives by air.

43. The expert from the United Kingdom expressed the view that such carriage should be permitted on cargo aircraft.

44. The expert from the United States of America drew attention to some proposals made in document ST/SG/AC.10/C.2/R.13, addressed to the Group of Rapporteurs, which were of concern to the Group of Experts since they related to explosives for which the percentage of water had been set at 10 per cent (sodium picrate, trinitroaniline and 2,4-dinitrophenylhydrazine). The Secretariat will, if it should be found necessary, prepare an excerpt from that document for the next session of the Group of Experts, at which the question of the percentage of water is to be considered in detail.

DIVISION 1.5 AND APPROPRIATE TEST CRITERIA

45. For its consideration of the item the Group had before it a proposal by the expert from the Federal Republic of Germany (ST/SG/AC.10/C.1/R.3) and a proposal by the expert from the United States of America (ST/SG/AC.10/C.1/R.6, section II (b)).

46. The proposals were respectively introduced by the expert from the Federal Republic of Germany and the expert from the United States of America, who answered questions and furnished information on their experience in that highly-specialized field.

47. The expert from the United States of America pointed out that the test proposed in his document would be additional to the fire test and would accordingly mark a further step towards a better definition of division 1.5.

48. The expert from Canada circulated a paper outlining the findings - already reported orally - of studies and experiments carried out in his country.

49. The expert from the Federal Republic of Germany said that a test of the kind proposed by the expert from the United States of America merited close consideration. He concluded his statement by requesting that the matter should be studied by a small group.

50. The Group agreed to that proposal, and the expert from Canada invited the small group to meet in his country early in May 1978. He was warmly thanked for his invitation.

51. The small group's terms of reference were defined as being:

(a) to identify the most hazardous substance that could be included in division 1.5;

(b) to consider in detail, and enumerate, the test procedures available for distinguishing between division 1.5 and the other divisions of Class 1;

(c) to recommend to the Group of Experts on Explosives those among the aforesaid procedures that might be adopted because of their practical applicability and reproducibility.

52. It was agreed that those terms of reference should be flexibly interpreted.

REVISION OF TEST PROCEDURE

53. The expert from the United Kingdom, after describing tests carried out on various types of ammunition, said that he would submit a document for the next session, and also a film showing experiments carried out on articles that were at the boundary of division 1.4 S.

OTHER MATTERS

New structure of the Recommendations

54. The Group considered with interest the proposals - other than the suggestions in annex 2, which had already been adopted - set out in document E/CN.2/CONF.5/R.611, submitted by the expert from the Union of Soviet Socialist Republics. It took the view that, while the subject as a whole came more properly within the purview of the Group of Rapporteurs, the Group of Experts should nevertheless be entitled to express itself on certain items, such as those dealt with in annex 1, paragraphs 2.1, 3.2 and 5.2, and the whole of annex 4, and should in any case examine the entire draft as revised by the Group of Rapporteurs.

55. In that connexion the Group considered that the amendments proposed for chapter 10 of the Recommendations were desirable.

Hazard information system (HIS)

56. In connexion with the information given by the expert from the United States of America in section VII (g) of document ST/SG/AC.10/C.1/R.6, the expert from the United Kingdom submitted a conference room paper containing his proposals for the determination of code numbers for explosives by the system recommended for other dangerous goods.

57. The experts from the United States of America and the Union of Soviet Socialist Republics stated that for the time being no HIS code number was necessary for substances and articles of Class 1.

58. After a long discussion the Group agreed that the system used by the Group of Rapporteurs was not suitable for explosives. It would inform the Committee of that decision.

Nitrocellulose

59. The Group examined the proposal concerning nitrocellulose made in section VII (b) of the document submitted by the expert from the United States of America. The proposal to add a new note was adopted, the note taking the form shown in annex 2 to this report.

PETN, dry

60. The Group considered the proposal, made by the expert from the United States of America in section VII (d) of his document, for deletion of the last sentence in paragraph 4.1 (b) of the Recommendations. After discussion, the Group adopted the amendment shown in annex 4 to this report. A proposal that dry tetryl should be adopted as a reference standard was discussed, but it was agreed that a more detailed discussion concerning tetryl would have to be deferred until the next session.

Clarification of paragraph 4.9 (c) (ii)

61. The proposal by the expert from the United States of America in section VII (i) of his paper was adopted (see annex 4 to this report).

Changes in figure 4.1

62. The proposal in section VII (j) of that paper was accepted as a necessary consequence of a decision taken earlier concerning classification (see annex 4 to this report).

Changes in the definitions of Compatibility Groups E and F

63. The Group considered the proposal made in document ST/SG/AC.10/C.1/R.6, section VII (k). The proposal was adopted (see annex 4 to this report).

NEXT SESSION AND FUTURE WORK

64. The next session of the Group will take place during the summer of 1978. It was recalled that an informal meeting would be held in Canada at the beginning of May 1978 to consider the problems relating to division 1.5 referred to in paragraph 51 of this report.

65. The Group decided to place the following questions on the provisional agenda for its next session:

New entries in Class 1;

Additions to packing sheets (to take account of technological developments);

Technical and editorial revision of chapters 4 and 10 of the Recommendations;

Water-wetted explosives (hexolite, octolite, pentolite, nitroguanidine with not less than 15 per cent water, which are not in division 1.1);

Entries in division 1.5 and appropriate test criteria;

Other matters.

Annex 1

NEW ENTRIES IN CLASS 1

Note to the Group of Rapporteurs*/

1. The Group of Experts informs the Group of Rapporteurs that it is not prepared to enter DIAZONIUM SALTS AND DIAZO COMPOUNDS, n.o.s., in Class 1. If there is a need to include individual substances of this type in Class 1, each substance should be considered individually, and it will be necessary for the Group to be supplied with information as to the substance's properties and the type of packaging proposed.

2. The Group of Experts recommends the Group of Rapporteurs should the latter wish to include DIAZONIUM SALTS AND DIAZO COMPOUNDS, n.o.s., in Class 4 or in the divisions within Class 4, to adopt provisions to the effect that such substances should not have explosive properties. The Group would suggest that no substance should be so classified unless the national competent authorities concerned are satisfied that the substance has been tested and proved to:

(a) be less sensitive to ignition on impact than m-dinitrobenzene; and to

(b) burn, without exploding, when heated to its decomposition temperature in air.

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*/ The Group of Rapporteurs has agreed to consider the question at its twenty-first session (March 1978).

Annex 2

AMENDMENTS TO THE LIST AND TO THE SPECIAL PROVISIONS UNDER CERTAIN ENTRIES

(ST/SG/AC.10/1, chapters 2 and 3),

as adopted by the Group

I. New entries

Number	Designation	Class Division	Subsidiary Risks	Special Provisions	Packing Method
0395	ROCKET MOTORS, LIQUID FUELLED	1.2 J	+	-	E 103
0396	ROCKET MOTORS, LIQUID FUELLED	1.3 J	+	-	E 103
0397	ROCKETS, LIQUID FUELLED, with bursting charge	1.1 J	+	-	E 103
0398	ROCKETS, LIQUID FUELLED with bursting charge	1.2 J	+	-	E 103
0399	BOMBS, CONTAINING INFLAMMABLE LIQUID, with bursting charge	1.1 J	+	-	E 103
0400	BOMBS, CONTAINING INFLAMMABLE LIQUID, with bursting charge	1.2 J	+	-	E 103
0401	DIPICRYL SULPHIDE	1.1 D	+	15 */	E 2
0402	AMMONIUM PERCHLORATE having average particle size of less than 45 microns	1.1 D	+	-	E 2
0403	FLARES, AERIAL	1.4 G	+	-	E 133
0404	" "	1.4 S	+	-	E 133
0405	CARTRIDGES, SIGNAL	1.4 S	+	-	E 115

*/ The Group of Experts on Explosives asked the Group of Rapporteurs whether dipicryl sulphide had toxic properties. At its twentieth session the Group of Rapporteurs replied that it lacked adequate information on the substance's toxicity, and it agreed to include in the list a new entry covering this substance when the latter contained more than 10 per cent water and was carried in small quantities.

II. Amendments to the list

0042 Read:

"0042 BOOSTERS* 1.1 D + - E 107".

0088 Delete the entry.

0225), 0268), 0283) Delete the word "(gaines)" from the text of these entries.

0342), 0343) In the "Special provisions" column, insert "105".

III. Addition to chapter 3

Add the following note:

"105. Nitrocellulose with not less than 25 per cent alcohol by weight, or with not less than 18 per cent plasticizing substance by weight, and not exceeding 12.6 per cent nitrogen by dry weight, packed in receptacles so constructed that explosion by reason of increased internal pressure is not possible, may be appropriately classified in division 4.1 (Serial number 2556 or 2557).".

Index

Add to index:

"Flares, aeroplane, see 1.3 G 0093
see 1.4 G 0403
see 1.4 S 0404
Flares, signal, see 1.4 S 0405
Fuzes, see 1.1 B 0106
combination, percussion, time, see 1.2 B 0107
see 1.4 B 0257
see 1.4 S 0367
see 1.3 G 0316
see 1.4 G 0317 and
see 1.4 S 0368"

Annex 3

PACKING OF EXPLOSIVES
(see ST/SG/AC.10/1)

Amendments adopted by the Group

Chapter 10, paragraph 10.2

Add a fifth subparagraph to paragraph 10.2 (page 207):

"Where boxes of ordinary natural wood are specified, plywood or reconstituted wood may be substituted for that material provided that they are compatible with the explosive carried."

Chapter 10: Packing methods for explosives

Insert "significant" before "movement" in the following packing methods:

E102, E106, E108, E112, E113, E114, E117, E118, E122, E123, E124, E126, E129, E130, E131, E132, E133, E134, E136, E137, E138, E139, E140, E141, E142, E145, E146, E148, E149, E150, E152, E154 and E157.

Chapter 10: Packing method E.107

Replace by the following:

"Method E107

(a) Boosters which are finished articles consisting of closed metal, plastics or fibreboard receptacles that contain a detonating explosive, or consisting of a plastics-bonded detonating explosive.

Packagings

Inner: Not necessary

Outer: Boxes

fibreboard (4G1)
natural wood, ordinary (4C1)

(b) Cast or pressed boosters in tubes or capsules without end closures

Packagings

Inner: Receptacles

fibreboard
metal
plastics

Sheets

plastics
paper

Outer: Boxes

fibreboard (4G1)
natural wood, ordinary (4C1)"

Annex 4

Amendments to chapter 4

"SPECIAL RECOMMENDATIONS RELATING TO CLASS 1"

(ST/SG/AC.10/1)

adopted by the Group

4.1(b) Replace the last sentence by:

"The carriage of explosive substances whose sensitivity to friction and impact is equal to or greater than that of dry PETN should be prohibited except where specially authorized.

4.2(c)(ii) In the last sentence, replace "Division 1.2," by "Division 1.1 or 1.2,".

4.10 In the first line, replace "thirty-one" by "thirty-three".

4.68 The description of "Boosters (gaines)" should be replaced by:

"Boosters

Articles containing a detonating explosive and used to increase the initiating power of detonators or detonating cord (fuse).".

Figure 4.1 In column "J" insert "1.1 J" opposite Hazard Division "1.1" and insert "1.2 J" opposite Hazard Division "1.2".

Figure 4.2 The definitions of Compatibility Groups E and F should be amended as follows:

(a) Compatibility Group E. Add at the end of the definition: "(other than one containing an inflammable or hypergolic liquid)".

(b) Compatibility Group F. Read: "Article containing secondary detonating explosive, with its own means of initiation, with a propulsive charge (other than one containing an inflammable or hypergolic liquid) or without a propulsive charge.".

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GROUP OF EXPERTS ON EXPLOSIVES

Eighteenth session
Geneva

REPORT OF THE GROUP OF EXPERTS ON ITS EIGHTEENTH SESSION (7 - 11 August 1978)

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Annex 2: List of dangerous goods most commonly carried; Special provisions relating to individual substances and articles (ST/SG/AC.10/1/Rev.1, Chapters 2 and 3): Amendments adopted by the Group

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Annex 4: Special Recommendations on packing for Class 1 (ST/SG/AC.10/1/Rev.1, Chapter 10): Amendments adopted by the Group

Annex 5: Procedures for determining the assignment of substances and articles to Class 1 and among the Divisions of that Class, with particular reference to Division 1.5

REPORT

1. The Group of Experts on Explosives held its eighteenth session at Geneva from 7 to 11 August 1978. Experts from the following countries participated in its work: Canada; France; Italy; Germany, Federal Republic of; Japan; Union of Soviet Socialist Republics; United Kingdom; United States of America. Pursuant to paragraph 7 of Economic and Social Council resolution No. 2050 (LXII) of 5 May 1977, the expert from Japan in the Committee of Experts had notified the Secretariat of his intention to participate in the work and voting of the Committee's subsidiary bodies. The Inter-Governmental Maritime Consultative Organization (IMCO) and the Central Office for International Railway Transport (OCTI) also took part in the Group's work.

ADOPTION OF THE AGENDA

2. The Group adopted the provisional agenda proposed by the secretariat (ST/SG/AC.10/C.1/R.12).

ELECTION OF CHAIRMAN

3. Mr. E.G. WHITEHEAD (United Kingdom) was re-elected Chairman on the proposal of the expert from the United States of America, supported by the experts from Canada and the Union of Soviet Socialist Republics. The other experts signified their unanimous agreement.

PARTICIPATION OF AN OBSERVER IN THE WORK OF THE GROUP

4. The Group invited experts from the Netherlands to participate in the Group's work at its next session.

ENTRIES IN CLASS 1

General text introducing Chapter 2

5. The Group considered what general text should be included at the head of Chapter 2 in order to meet the point raised by IMCO in paragraph 8 of document ST/SG/AC.10/C.1/R.2. The expert from the United Kingdom proposed that a text included in the 1973 supplement to the Recommendations, which text had not been reproduced in the current Recommendations, should be reinstated. It was agreed that he would submit that text at a later stage, taking into account the revision of Chapter 13 now proceeding, of which the expert from the United States of America had reminded the meeting.

6. The prepared text was unanimously adopted by the Group in the form reproduced in annex 2 hereto. However, the expert from the United States of America pointed out that such reinsertion in Chapter 2 seemed to conflict with paragraphs 13.5 and 13.7 of the Recommendations.

Diazo compounds

7. The Group resumed consideration, begun at the previous session, of the classification of the diazo salts and compounds which might be assigned to Class 1 (ST/SG/AC.10/C.1/1, para. 6). To settle the problem the expert from the United Kingdom proposed adoption of the solution set out in document ST/SG/AC.10/C.1/R.100, likewise submitted to the Group of Rapporteurs. In the end, after a long discussion, the Group agreed that any substance with explosive properties should be inclu in Class 1.

Styphnic acid

8. On the proposal of the expert from the United Kingdom, the discrepancy in the references to trinitroresorcinol (styphnic acid) (0219) respectively contained in chapter 2 of the Recommendations and in the index (ST/SG/AC.10/C.1, para. 9) was eliminated by instructing the secretariat to bring the text of the index (0219) into line with the text in chapter 2 (see annex 2 hereto).

Isosorbide dinitrate and pentaerythrite tetranitrate

9. The expert from the Federal Republic of Germany introduced the proposals contained in document ST/SG/AC.10/C.1/R.19, which replaced those in the document (ST/SG/AC.10/C.1/R.4) submitted at the preceding session. The Group took the view that isosorbide dinitrate containing not less than 60 per cent lactose, mannose, starch or $CaHPO_4$ by weight did not belong to Class 1. It recommended the Group of Rapporteurs to consider the possibility of classifying that substance in Division 4.1. The Group of Experts did not support the expert from the Federal Republic of Germany in his proposal concerning mixtures of pentaerythrite tetranitrate containing not less than 80 per cent lactose, mannose, starch or $CaHPO_4$ by weight. It was equally divided on the question of assigning the "Z" symbol to the substance, a step which might have settled the question.

Dipicryl sulphide

10. The Group considered the outstanding question concerning dipicryl sulphide (0401), a substance added to the list at the previous session. It took the view that since the substance was not toxic the asterisk placed opposite its name in annex 2 to report ST/SG/AC.10/C.1/1 was unnecessary.

Dinitrobenzene and tetrazol-1-acetic acid

11. The Group considered the proposal by the Government of the Federal Republic of Germany in document ST/SG/AC.10/C.1/R.18 concerning dinitrobenzene and tetrazol-1-acetic acid, which substances in that Government's view should be included in Class 1 (1.5 C and 1.4 C respectively). The proposal was adopted (see annexes 2 and 4 hereto).

Boosters (gaines)

12. At its previous session the Group had agreed to review the description of "Boosters (gaines)" at the present session (ST/SG/AC.10/C.1/1, para. 15). The expert from the United States of America, at whose suggestion the decision to review the matter had been taken, said that what he had had in mind was the need to review the packagings, and not (as stated in the report on the previous session) the description. He added that the word "gaines" was outdated, so that its use in the definition should nevertheless be reviewed. Having noted that the problem had already been dealt with in annex 2 to the report on the Group's previous session (ST/SG/AC.10/C.1/1), the Group, confirming its earlier decision, agreed to delete the word "gaines" wherever it occurred in the Recommendations, except in the index and the descriptions, where it will continue to appear (see ST/SG/AC.10/C.1/1, annex 2).

Replies to questions raised by the Group of Rapporteurs at its twentieth session

13. Annex 3 to the report of the Group of Rapporteurs on its twentieth session (ST/SG/AC.10/C.2/1) raised a number of questions to which the Group of Experts gave the following replies.

14. Regarding the three substances listed under (1)(a) in the annex, the Group considered that, in general, a primary explosive should remain in Class 1 whatever the percentage of added water, and that no substance could be placed in Class 4 if the probability of explosion during carriage was greater than that attaching to any substance in Division 1.5, unless quantity limitations were prescribed when the substance was placed in Class 4.

15. With regard to the opinion to be transmitted to the Group of Rapporteurs on the three substances specifically mentioned, the Group of Experts felt that it did not yet possess information sufficiently precise to serve as a basis for a considered opinion on the matter. In its view it would be for the Governments having an interest in the carriage of one or the other of those substances to supply appropriate information on the substance's behaviour.

16. On the questions raised under (1)(b) the Group expressed the following opinions:

In the absence of information on the properties of the articles classified by the Group of Rapporteurs in Division 4.1 (entries 2791 and 2792), the Group of Experts was unable to decide whether those articles did or did not belong to Class 1, and it recommended meanwhile that they should be regarded as potential explosives (see "CARTRIDGES, POWER DEVICE" and "IGNITERS");

There were already seven entries relating to fuzes, and the competent authorities should use those entries for classifying the articles in question;

The same observation applied to power devices, for which there were four entries;

The ammonium perchlorate in question was already included in Class 1 (entry 0402); and

Nitrocthane could in the Group's view not be considered as belonging to Class 1.

Various amendments of detail

17. Turning to annex 4 to report ST/SG/AC.10/C.1/1, the Group agreed that under figure 4.2, paragraph (b) (definition of Compatibility Group F) the word "propulsive" should be replaced in the English text by the word "propelling", in order to bring the text into line with the other provisions including the term.

18. The proposals by the expert from Canada in document ST/SG/AC.10/C.1/R.14 were adopted as set out in annex 2 hereto.

ENTRIES IN DIVISION 1.5 AND APPROPRIATE TEST CRITERIA

19. The expert from Canada outlined the report (ST/SG/AC.10/C.1/R.15) on the informal meeting which the experts had held at Ottawa from 8 to 12 May 1978, at the invitation of the expert from Canada, in order more particularly to consider the matters referred to in paragraph 51 of the Group's report on its previous session (ST/SG/AC.10/C.1/1).

20. The Group applied itself first to revising the definition of Division 1.5, and it adopted the revised definition proposed in document ST/SG/AC.10/C.1/R.15, paragraph 8, as amended by the expert from the United States of America (see annex 1 hereto). It also decided to request IMCO to show Division 1.5 separately from the other Classes and Divisions in the same way as for Division 1.1, Compatibility Group D.

21. The definition of type B blasting explosives reproduced in paragraph 9 of the report on the Ottawa meeting was approved (see annex 3 hereto).

22. The Group then considered the flow-chart reproduced in document ST/SG/AC.10/C.1/R.15, annex 2, amendments to which were proposed from the floor by the expert from the United States of America with the aim of broadening its scope. The proposed amendments prompted a number of comments by the expert from the Federal Republic of Germany.

23. Faced with the choice between considering first the controversial points emphasized by the expert from the Federal Republic of Germany, or considering concurrently the provisions on tests and the two flow charts under discussion (that in document ST/SG/AC.10/C.1/R.15, annex 2, and that proposed by the expert from the United States of America), the Group opted for the second alternative.

24. The discussion enabled the difficulties to be solved and the two flow charts submitted to be reconciled. In the end the Group adopted the flow chart and provisions set out in annex 5 hereto.

25. The Group agreed moreover that the provisions adopted at the current session and annexed to the sessional report (annex 5) should first be commented on by the experts and organizations concerned. The Group would then submit proposed recommendations to the Committee in the light of the comments thus received.

26. The Group approved as a whole the report of the experts who had met at Ottawa from 8 to 12 May 1975 and expressed its thanks to the Canadian expert for his invitation.

27. The Group considered the proposal by the Government of the Federal Republic of Germany concerning the Koenen test (ST/SG/AC.10/C.1/R.17); the proposal was adopted. The expert from the United States of America entered a reservation on the decision taken.

28. On the proposal of the United Kingdom expert, the Group endeavoured to determine what scale should be adopted for the "external-fire test" or "bonfire test" 3 (c). The Group failed to agree on the scale of the test and the question was left pending.

29. The note "N.B. Most important" in paragraph 12.1 ("Test Series 1") of document ST/SG/AC.10/C.1/R.15 prompted a long discussion in the course of which the expert from the Federal Republic of Germany expressed the view that it would lead to classification difficulties. A more flexible version of the text was adopted (see annex 5 hereto).

30. The expert from the United States of America proposed amendments to document ST/SG/AC.10/C.1/R.15, paragraph 11. The Group decided that the content of that paragraph would not be included in annex 5 hereto, as the question would have to be left open.

31. The United Kingdom expert explained the items not yet considered in document ST/SG/AC.10/C.1/R.24. Those items prompted a highly technical exchange of views between the author of the document and the experts from the United States of America and the Federal Republic of Germany.

32. The United Kingdom expert outlined document ST/SG/AC.10/C.1/R.21, in which his Government proposed test procedures for explosive substances after they had been filled into articles or packed for conveyance. In his opinion it would be sufficient to include in the Recommendations a provision similar to the one included in RID.

33. The expert from the United States of America said that he agreed with the United Kingdom expert with regard to the aim sought, and that it was with that aim in mind that he had submitted proposals for a mechanical-safety test. The United Kingdom expert said that he would continue to study the matter.

34. The representative of IMCO, reverting to document ST/SG/AC.10/C.1/R.15, paragraph 10, and to the note concerning the definition of Division 1.5, asked what should be done with small quantities of substances of Division 1.5 as regards "segregation". He was told in reply that any cargo for carriage by sea should be treated as belonging to Division 1.1.

PACKING

Stacking test

35. The Group examined the proposal submitted to the Group of Rapporteurs by the Rapporteur from Italy (ST/SG/AC.10/C.2/125), which largely related to the carriage of explosives. The Group considered that the best solution would be to delete the sentence "However, for sea transport ... is 8 m." from paragraph 9.101 (Stacking test).

Packing methods

36. Annex 3 to the Group's report on its previous session prompted comments, more particularly by the representative of IMCO, concerning packing method E 107. In the end the Group confirmed its previous position and requested the secretariat to take note of two minor corrections, i.e. the replacement of "(page 207)" by "(page 229)" in the second line of the English text of annex 3 and the deletion of "E 136" from the list of packing methods given further down on the same page. It was also agreed that packing method E 115 should be amended as shown in annex 4 hereto.

37. Packing method E 25 for the substances referred to in paragraph 11 hereof is also referred to in that annex.

38. The Group considered two proposals by the expert from the United Kingdom aimed at amending packing methods E 112 and E 6, i.e. to add "Plywood (4D1)" to the list of outer packagings for method E 112 and to add "Drums, fibreboard (1G1, 1G2 and 1G3)" under method E 6.

39. It was pointed out that the first of those proposals had been met by the decision taken at the previous session to cover such cases by the general provision 10.2. The second proposal was adopted, a reservation being entered by the expert from Canada (see annex 4).

TECHNICAL AND EDITORIAL REVISION OF CHAPTERS 4 AND 10 OF THE RECOMMENDATIONS

Definition of the terms "mass explosion" and "entire load"

40. In document ST/SG/AC.10/C.1/R.22 the Government of the United Kingdom had brought up the question of the interpretation to be placed on the terms "mass explosion" and "entire load" as used in paragraph 4.65 of the Recommendations.

41. The expert from the United States of America described the practice followed in his country and stated that the figure of 90 per cent cited in paragraph 3 of the document was applied in a particular case only.

42. Referring to paragraph 5, the French expert said that the case in question concerned packages of small quantities carried on road vehicles, whereas the United Kingdom interpretation related to large loads carried in confined spaces.

43. The United Kingdom expert thanked the previous speakers for their explanations and said that he would revert to the matter at a later stage.

Recasting of Chapter 4 of the Recommendations ("Special recommendations relating to Class 1")

44. The Group first considered document ST/SG/AC.10/C.1/R.23, which was introduced by the expert from the United Kingdom and sought to recast Chapter 4 of the Recommendations (the aforesaid document amplified the text of document ST/SG/AC.10/C.1/R.8, drafted by a small group during the previous session). The document was adopted in principle and a small group was set up to revise it, as to form only, during the present session.

45. The expert from the United Kingdom undertook to prepare for the next session a new version of document ST/SG/AC.10/C.1/R.23 which would be based on the text of document ST/SG/AC.10/C.1/R.8/Rev.1 (to be prepared by the secretariat), which would reproduce the results of the small group's work and would take into account such decisions adopted at the present session as affected the provisions of document ST/SG/AC.10/C.1/R.23.

Recasting of Chapter 10 of the Recommendations

46. The expert from the Union of Soviet Socialist Republics stated his views on a new edition of the Recommendations, which should achieve simplification, and he introduced the proposals contained in annex 4 to document E/CN.2/CONF.5/R.611, which related particularly to chapter 10.

47. Those proposals were approved by the Group and will be required to be taken into consideration in any new edition of the Recommendations.

48. The expert from the Union of Soviet Socialist Republics agreed to prepare a draft on those lines for chapter 10 and transmit it to the secretariat in the near future.

STRUCTURE OF THE RECOMMENDATIONS

Content of the list

49. The expert from the United Kingdom outlined document ST/SG/AC.10/C.2/R.95, submitted to the Group of Rapporteurs by the Rapporteur from the United Kingdom. He pointed out that the guidelines indicated in the document were those already followed by the Group of Experts.

Chapter 9 of the Recommendations ("General recommendations on packing")

50. The Group of Experts endorsed the proposals put forward by the Rapporteur from the Union of Soviet Socialist Republics in document E/CN.2/CONF.5/R.611, annex 3, and recommended the Group of Rapporteurs to note that position.

Chapter 13 of the Recommendations ("Recommendations on consignment procedures")

51. The expert from the United States of America proposed that the Group of Experts should at the current session express an opinion on the work done by the Group of Rapporteurs on recasting chapter 13 of the Recommendations, in so far as that work related to Class 1. The Group approved that proposal.

52. As it was not found possible to make the most recent version of the proposals relating to Chapter 13 available at the time of the discussion, the Group of Experts asked the Committee of Experts to refer to the Group, for its opinion, the parts of Chapter 13 which affected Class 1.

OTHER MATTERS

Title of Division 1.2

53. The expert from the United States of America proposed that in paragraph 1.12 of the Recommendations the title following "Division 1.2" should be amended to read: "Articles which have a projection hazard but not a mass explosion hazard". A decision was deferred until the next session.

Special recommendations relating to Class 1 (paragraph 4.1)

54. The Group adopted a suggestion by the representative of IMCO aimed at improving the amendment made at the previous session to paragraph 4.1 (b) (ST/SG/AC.10/C.1/1, annex 4) (see annex 3 hereto).

New entries for "Fuzes, detonating, with protective features"

55. The expert from the United Kingdom proposed the insertion of three new entries for "Fuzes, detonating, with protective features". The proposal was adopted (see annex 2 hereto).

Hazards related to chemical compatibility

56. By document ST/SG/AC.10/C.1/R.20 the Group had been made aware of a problem with which the Australian and New Zealand authorities had to contend - the hazards that chemical incompatibility could create when type C blasting explosives containing a chlorate were carried together with blasting explosives of type A, B or D containing ammonium salts.

57. The Group confirmed its earlier position as set forth in paragraph 3 of the document, and the expert from the United Kingdom undertook to bring that position to the attention of the authorities which had raised the problem with the Group.

Multiple labelling

58. The Group considered the proposals put forward by the expert from the United States of America in document ST/SG/AC.10/C.1/R.16 concerning the multiple labelling of explosives. The Group endorsed the document's conclusions and transmitted them to the Group of Rapporteurs.

FILM SHOWING

59. A film was shown by the United Kingdom expert on trials carried out in his country in March and April 1978 for the purpose of demonstrating the effects of fire on articles of Divisions 1.2, 1.4 and 1.4 S and confirming their respective classifications. The film showed the results of six external-fire tests on six different articles of Class 1, one external-fire test on household articles (e.g. camping-gas aerosol canisters) and one test on articles containing packaged detonating explosives of which one had exploded. The Group thanked the United Kingdom expert for showing the film, which had gripped the audience's attention throughout.

FUTURE WORK

60. The Group considered that its programme of work for 1979 and 1980 should be as follows:

1. Revision of Chapter 13 with reference to Class 1.

2. Completion of system of test procedures for determining the assignment of substances and articles to Class 1.

3. Confirmation of the validity of the system of test procedures by exchanging results of tests performed on the basis of the reference standards.

4. Incorporation of the systems of test procedures in the revised Chapter 4 of the Recommendations.

5. Revision of Chapter 10 (packing methods).

6. Formulation of provisions for the loading of intermodal containers with substances and articles of Class 1, and of provisions governing the carriage of such containers.

7. Additions to the entries and packing sheets for Class 1.

CALENDAR OF WORK

61. The Group took the view that it must be able to hold at least one session a year in order to carry out its work. That session should be associated with a session of the Group of Rapporteurs.

APPROVAL BY THE COMMITTEE OF THE GROUP'S REPORTS ON ITS SEVENTEENTH AND EIGHTEENTH SESSIONS

62. The Group submits to the Committee of Experts, for approval, the reports on its seventeenth and eighteenth sessions (ST/SG/AC.10/C.1/1 and ST/SG/AC.10/C.1/2).

Annex 1

SCOPE OF THE RECOMMENDATIONS
(ST/SG/AC.10/1/Rev.1, Chapter 1)

Amendments adopted by the Group

Paragraph 1.12

Read the definition of Division 1.5 as follows:

"Division 1.5. Very insensitive substances which have a mass explosion hazard.

This Division comprises explosive substances which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport. As a minimum requirement they must not explode in the external fire test (see 4.63).

Note. The probability of transition from burning to detonation is greater when large quantities are carried in a ship.".

Annex 2

LISTING AND CLASSIFICATION

LIST OF DANGEROUS GOODS MOST COMMONLY CARRIED
(ST/SG/AC.10/1/Rev.1, Chapter 2)

Amendments adopted by the Group

(1) Chapter heading

Insert after the heading of the Chapter:

"(For Class 1, the authorized short name is indicated in the list by capital letters. Capital letters in parentheses indicate an authorized alternative short name).". 1/

1/ Insert the same text at the end of paragraph 13.5.

(2) Additions to the list

Serial Number	Designation	Class, Division	Subsidiary Risks	Special Provisions	Packing Method
0406	DINITROBENZENE	1.3 C	+		E 25
0407	TETRAZOL-1-ACETIC ACID	1.4 C	+		E 25
0408	FUZES, DETONATING* with protective features	1.1 D	+	119	E 137
0409	FUZES, DETONATING* with protective features	1.2 D	+	119	E 137
0410	FUZES, DETONATING* with protective features	1.4 D	+	119	E 137

(3) Amendments to existing entries

0110 Read:

English	French
"GRENADES, PRACTICE, hand or rifle"	"GRENADES D'EXERCICE à main ou à fusil".

0214 Replace "35 per cent" by "30 per cent".

0219 "TRINITRORESORCINOL (STYPHNIC ACID), dry or containing, by weight, less than 20 per cent water (or mixture of alcohol and water) 1.1 D + E 2"

0318)
0372) Same amendment as to 0110.

(4) Deletion

0088 Delete the entry.

SPECIAL PROVISIONS RELATING TO INDIVIDUAL SUBSTANCES AND ARTICLES
(ST/SG/AC.10/1/Rev.1, Chapter 3)

Amendments adopted by the Group

"Special recommendation

110. The detonating fuze must incorporate protective features such that it is very unlikely to cause detonation of a contrivance in the conditions encountered in transport (paragraph 4.60 "Initiation, means of ..." (2)).".

INDEX

Page 341, insert:

"DINITROSOBENZENE	1.3 C	0406".

Page 346, insert:

"FUZES, DETONATING* with protective features	1.1 D	0408
	1.2 D	0409
	1.4 D	0410".

Insert in the French index only (page 368): [Does not affect the English text].

Page 372, insert:

"TETRAZOL-1-ACETIC ACID	1.4 C	0407".

Page 344, delete:

"EXPLOSIVES, seismic*	0088".

Page 347, column 1, second entry, amend to read:

"GRENADES, PRACTICE, hand or rifle".

Page 374, column 1, last entry (0214):

Replace "35 per cent" by "30 per cent".

Page 57, (column 2, thirteenth entry), read:

"TRINITRORESORCINOL (STYPHNIC ACID), dry or containing, by weight, less than 20 per cent water (or mixture of alcohol and water)	1.1 D	0219".

ANNEX 3

SPECIAL RECOMMENDATIONS RELATING
TO CLASS 1
(ST/SG/AC.10/1/Rev.1, Chapter 1)

Amendments adopted by the Group

Paragraph 4.1 (b)

Replace the last sentence by:

"The transport of an explosive substance whose sensitivity to friction and impact is equal to or greater than that of dry pentaerythrite tetranitrate (PETN) should be prohibited except with the special authorization of the competent national authority."

Paragraph 4.63

Under "Explosives, blasting, type B", read:

"Blasting explosives which are mixtures of ammonium nitrate or other inorganic nitrates with explosives such as trinitrotoluene, with or without other substances such as wood-meal and aluminium powder, or mixtures of ammonium nitrate or other inorganic nitrates with other combustible substances which contain no explosive ingredients. */ These explosives shall not contain nitroglycerin, similar liquid organic nitrates, or chlorates.

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*/ The 'explosive ingredients' are 'explosive substances' as defined in paragraph 1.11.".

Annex 4

SPECIAL RECOMMENDATIONS ON PACKING FOR CLASS 1
(ST/SG/AC.10/1/Rev.1, Chapter 10)

Amendments adopted by the Group

Method P 6

Under "(a)", "(i)", "Outer:" and "(a)", "(ii)", "Outer:", add under "Drums":

"Fibreboard, convolutely wound plies (1G1)
fibreboard, spirally wound plies (1G2)
fibreboard, solid (1G3)".

Add:

"Method P 25

Packagings

Inner: Bags
plastics

Outer: Drums
fibreboard, convolutely wound plies (1G1)
fibreboard, spirally wound plies (1G2)".

Method P 115

Under "Outer", read at the end:

"steel (1A1)".

Delete the heading "Particular packing requirements" and the sentence following it.

Annex 5

PROCEDURES FOR DETERMINING THE ASSIGNMENT OF SUBSTANCES AND ARTICLES TO CLASS 1 AND AMONG THE DIVISIONS OF THAT CLASS, WITH PARTICULAR REFERENCE TO DIVISION 1.5

Adopted by the Group

(For action to be taken, see para. 25 of the report)

The following series of tests were adopted for inclusion in document ST/SG/AC.10/C.1/R.8/Rev.1:

"The inclusion of a substance or article in Class 1 requires both an assessment of its physical and chemical stability and a determination of the potential for explosion and deflagration. The data yielded by tests should by analysed systematically as indicated in the flow chart reproduced in appendix 1.

1. Test series 1

These tests will include:

(a) Small-scale preliminary tests;

(b) A shock test with a defined booster and confinement (e.g. a ballistic mortar or a Trauzl test);

(c) A combustion test or a thermal test (e.g. a Koenen test). If with an orifice of 2.0 mm or more an explosion is produced, the substance tested shall be assigned to Class 1 unless it is too dangerous for transport;

(d) An impact test;

(e) Such other, additional tests as may be required by the competent authorities.

2. Test series 2

These tests will include:

(a) An impact test. This test will have been performed as part of series 1. Because of the large number of procedures, the result will be related to a reference substance;

(b) A friction test. The comments made concerning the impact test apply to this test also;

(c) A stability test. [There was no support for a proposal that the test should demonstrate six months' stability at 55° C. The Government of the United States of America proposed that the present requirement of 48 hours at 75° C should remain.];

(d) A small-scale fire test. Examples referred to were the BAM gaslighter test and the United Kingdom Bickford fuse test. The test should determine the ease of ignition and the tendency to burn to detonation.

3. Test series 3

These tests will include:

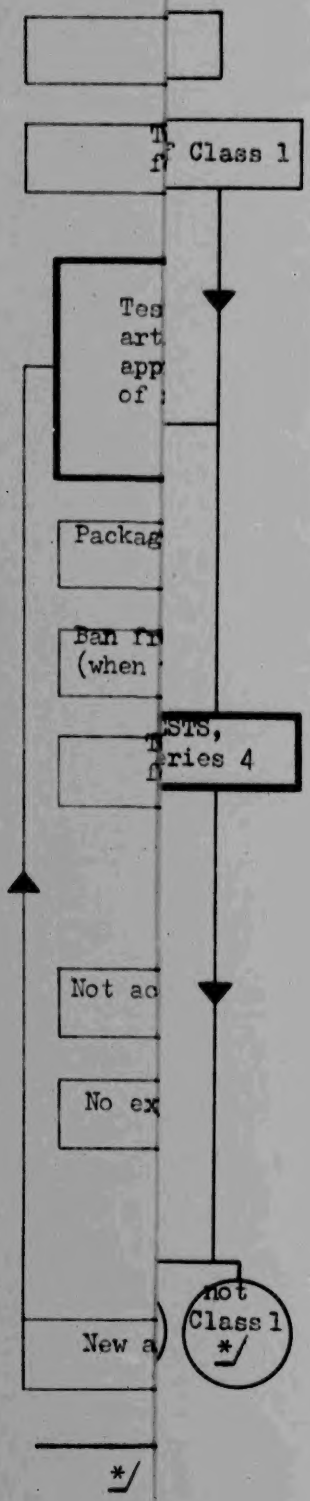
(a) A shock test, which may be a cap test or an equivalent test and shall be conducted at 25° C;

(b) A test of transition from deflagration to detonation (DDT);

(c) An external-fire test, or a test on a scale to be determined.

4. Test series 4

These tests are described in appendix 2.".


Class 1
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Class 1
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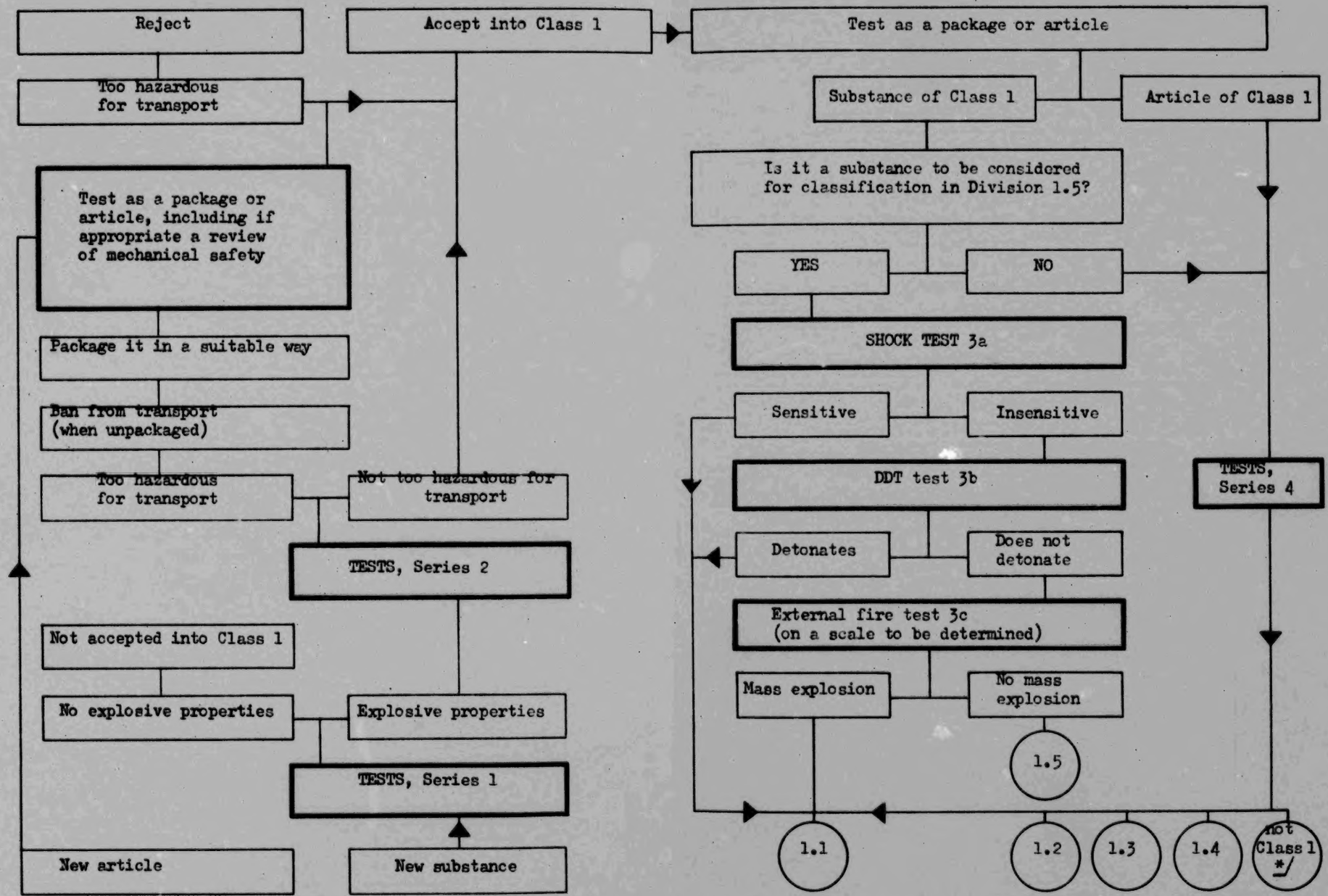
Appendix 1



*/ See paragraph 1.11(b) and (c).

Appendix 2

Description of series-4 tests

1. General

1.1. These instructions govern the hazard-division assignment and compatibility-group assignment of substances or articles of Class 1.

2. Hazard-division assignment

2.1. General observations

2.1.1. Assignment to a hazard division shall be performed on the basis of test results. The tests shall be applied to packages of explosive substances and articles in the condition and form in which they are tendered for carriage. Except as provided in paragraph 2.1.2., all types of packaging containing substances or articles of Divisions 1.2, 1.3 and 1.4 shall be subjected to the tests. Where explosive articles are to be carried without packaging, the tests shall be applied to the non-packaged articles.

2.1.2. Verification of the classification shall be undertaken if the substance or article or its packaging is degraded and the degradation might affect the behaviour of the item in the tests.

2.1.3. The tests shall not be required if:

The article, the explosive and the packaging */ can be unambiguously assigned to a hazard division by a qualified explosives expert on the basis of results from other tests or of available information **/, or

The packaged explosives are assigned to hazard division 1.1.

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*/ Note by the reviser: It would seem more logical to keep to the usual terms, i.e. "The explosive substance or article and the packaging" (in French = "- si la matière ou objet explosible et l'emballage").

**/ Note by the reviser: This English version is based on the present reviser's understanding of the original English text in document ST/SG/AC.10/C.1/R.15, the French version has (in French) "... or of information furnished by a qualified explosives expert".

2.2. Tests for hazard-division assignment

2.2.1. Types of tests

There are three types of tests;

Test A (single-package test)

A test on a single package for the purpose of determining:

Whether initiation or ignition in the package causes burning or explosion and whether burning or explosion is propagated in the package, and

In what way the surroundings are endangered by these effects.

Test B (stack test)

Test on a stack of packages for the purpose of determining:

Whether and in what way burning or explosion in the stack is propagated from one package to another and

In what way the surroundings are endangered in this event.

Test C (external-fire test)

Test on a stack of packages for the purpose of determining:

How the packages in the stack behave when involved in an external fire; and

Whether and in what way the surroundings are endangered by blast waves, heat radiation and/or fragment projection.

2.2.2. Sequential order of tests

The geometrical arrangement and the means of initiation shall be such as to produce the most disadvantageous test results.

2.2.2.1. Tests A, B and C shall be performed in alphabetical order.

(a) If explosive articles are carried without packaging, test A may be waived.

(b) If the content of the package in test A explodes so feebly as to exclude propagation of the explosive effect from one package to another, test B may be waived.

(c) If in test B virtually all the packages in the stack explode practically instantaneously, and the explosive substance or article is therefore to be assigned to hazard division 1.1., test C may be waived.

2.2.3. Repetition of tests

2.2.3.1. Tests A and B shall be carried out at least three times unless explosion of the entire contents occurs earlier; test C is normally performed once only.

2.2.3.2. If the results of the recommended number of tests do not enable the hazard division to be determined, the number of tests shall be increased.

2.2.4. Description of tests

2.2.4.1. Test A

2.2.4.1.1. The package shall be placed on the ground. For confinement, boxes or bags filled with earth or sand shall be placed around and on top of the package. The thickness of the confinement shall be not less than 0.5 m in every direction. If a dimension of the package exceeds 1 m, the thickness of the confinement shall be not less than 1 m in every direction.

2.2.4.1.2. The package may also be placed in a pit of sufficient depth. It shall be covered with boxes or bags filled with earth or sand so as to ensure adequate confinement for the top of the package also.

2.2.4.1.3. The point of initiation or ignition shall be situated at the centre of the package.

2.2.4.1.3.1. Packages containing explosive substances:

The means of initiation used shall be the standard electric blasting cap containing 0.6 g PETN (see Explosivstoff 21 (1973) No. 5, pp. 66 and 67) or some other electric detonator having the same effect.

The means of ignition shall be an electric igniter with a minimum ignition load or a thermal igniter capable of igniting the substance without difficulty.

2.2.4.1.3.2. Packages containing articles

Articles provided with their own means of initiation or ignition:

The functioning of an article near the centre of the package shall be stimulated by the article's own means of initiation or ignition. Other means of initiation or ignition may be used if under the original conditions it is impossible to stimulate functioning of the article. The article's own means of initiation or ignition may be replaced by another form of stimulus having the same effect.

Articles not provided with their own means of initiation or ignition:

An article near the centre of the package shall be replaced by another article whose functioning can be stimulated. In the same manner as the functioning of the article it replaces. If this [illegible] is likewise impossible in a particular case, the

2.2.4.2. Test B

2.2.4.2.1. At least five packages shall be stacked on the ground.

2.2.4.2.2. To ensure the necessary confinement, boxes or bags filled with earth or sand shall be placed around and on top of the stack of packages. The thickness of the confinement shall be not less than 1 m.

2.2.4.2.3. The point of initiation or ignition shall be situated in a package near the centre of the stack. The procedures defined in paragraphs 2.2.4.1.3.1. and 2.2.4.1.3.2. shall be followed.

2.2.4.2.4. Articles carried without packaging shall be tested in the same manner as packed articles having their own means of initiation or ignition.

2.2.4.3. Test C

2.2.4.3.1. Stack not less than five packages on a metal grid about 1 m above the ground. If necessary, encircle the stack with a steel strip to support it during the test.

2.2.4.3.2. Pile air-dried pieces of wood (not more than 30-50 mm thick) to form a lattice beneath the grid and round the stack of packages over a width of at least 50 cm in every direction. The lateral distance between the laths should be about 10 cm. Drench the whole with about 20 litres of fuel oil mixed with 10 per cent petrol and ignite the pile on two sides simultaneously. It is recommended that enough fuel should be used to keep the fire burning for at least 30 minutes or for the time considered necessary.

2.2.4.3.3. The stack of wood beneath the grid may be replaced by a receptacle filled with fuel oil with a 10-per-cent admixture of petrol. The surface area of the receptacle shall be greater than that of the stack of wood on the grid. The distance between the grid platform and the receptacle shall be 0.5 m.

2.2.4.3.4. Such data shall be assembled so as to enable the number of projections of appreciable size or range to be assessed.

2.2.5. Test report

2.2.5.1. A report on the series of tests shall be drawn up in accordance with the requirements of the competent authority. It shall in particular contain information on:

The composition of the substance or the structure of the article;

The quantity of substance or number of articles per test;

The type and construction */ of the packaging,

The test assembly, including in particular the nature, quantity and arrangement of the means of initiation or ignition used,

The course of the test, including in particular the time elapsing until the occurrence of the first noticeable **/ reaction of the substance or articles, the duration and characteristics of the reaction, and an estimate of the latter's completeness,

The effect of the reaction on the immediate surroundings (up to 25 m from the site of the test),

The effect of the reaction on the more remote surroundings (more than 25 m from the site of the test), and

The atmospheric conditions during the test.

2.2.6. Assignment to hazard divisions

2.2.6.1. A substance or article shall be assigned to the hazard division which corresponds to the results of the tests to which the substance or article, as packed for carriage, has been subjected. Other test results, and data assembled from accidents which have occurred, may also be taken into account. Definitions of the hazard divisions are given in Chapter 1.

2.2.6.2. If in test B or test C explosion of virtually the entire contents occurs almost instantaneously, the substance or article ***/ as packed for carriage shall be assigned to Division 1.1.

2.2.6.3. If in test B or test C only a few items explode at one time ****/ and the major hazard presented is that from dangerous projections, the substance or article shall be assigned to Division 1.2.

2.2.6.4. If in test A, B or C violent combustion occurs with no dangerous blast or projections, and radiant heat constitutes the major hazard, the substance or article shall be assigned to Division 1.3.

2.2.6.5. If during test B or test C combustion of low violence accompanied by moderate radiation of heat occurs, with no dangerous blast or projections, the substance or article shall be assigned to Division 1.4.

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*/ Note by the reviser: The French text has "matière" (= material).

**/ Note by the reviser: The French text has "notable" (= notable, noteworthy, substantial).

***/ Note by the reviser: The French text has "article" instead of the usual "objet".

****/ Note by the reviser: The French text omits "at one time".

2.2.6.6. Substances and articles in this division so packaged or designed that any hazardous effects arising from accidental functioning are confined within the package unless the package has been degraded by fire, in which case all blast or projection effects are limited to the extent that they do not significantly hinder fire-fighting or other emergency response efforts, in the immediate vicinity of the package, are in Compatibility Group S.

3. Determination of compatibility group

The compatibility group of the substance or article shall be determined on the basis of the description of compatibility groups given in fig. 4.2.

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COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS

GROUP OF EXPERTS ON EXPLOSIVES

REPORT OF THE GROUP OF EXPERTS ON EXPLOSIVES ON ITS NINETEENTH SESSION

(6-10 August 1979)

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REPORT

1. The Group of Experts on Explosives held its nineteenth session at Geneva from 6-10 August 1979. Experts from the following countries participated in its work: Canada; France; Italy; Germany, Federal Republic of; United Kingdom; Union of Soviet Socialist Republics; United States of America. The International Civil Aviation Organization (ICAO) also took part in the Group's work. Upon invitation from the Group of Experts on Explosives, experts from the Netherlands also participated in the work. An observer from the Harmonized Commodity Description and Coding System Advisory Council (HSAC) participated in this session, at the invitation of the secretariat.

ADOPTION OF THE AGENDA

2. The Group of Experts adopted the provisional agenda prepared by the secretariat, ST/SG/AC.10/C.1/R.25 and Add.1.

ELECTION OF CHAIRMAN

3. On the proposal of the expert from the United States of America supported by the experts from Canada and the Union of Soviet Socialist Republics Mr. R. R. Watson (United Kingdom) was unanimously elected Chairman.

GENERAL MATTERS

4. The Chairman referred to critical comments made by some Governments at the last meeting of IMCO Sub-Committee on the Carriage of Dangerous Goods concerning the work of the United Nations Committee of Experts and its subsidiary bodies. There had been complaints of too frequent changes in the Recommendations sometimes revoking earlier decisions. The same uneasy feelings had been reported in the Joint IRO/ADR Committee.

5. The IMCO Sub-Committee on the Carriage of Dangerous Goods had expressed the opinion that many of these objections could possibly be avoided if the national delegations to the meetings of the Committee of Experts included experts with experience in maritime transport.

6. The Group of Experts acknowledged some of the criticism mentioned and agreed in particular to indicate in future if proposed changes are of an urgent nature and should therefore be implemented by Governments and Transport Organizations as soon as possible or if implementation of such changes is not of a critical nature.

7. The majority of the Group of Experts felt that there was no need to specify a so-called "maturing period" with regard to the implementation of the United Nations Recommendations and agreed that they should be continuously updated and that in future an attempt should be made to avoid whenever possible radical and controversial changes.

REVISION OF CHAPTER 13 WITH REFERENCE TO CLASS 1

8. The expert from the United Kingdom introduced document ST/SG/AC.10/C.1/R.37 concerning the revision of Chapter 13.

9. The Group of Experts agreed that the proper shipping name which will in future appear in Chapter 2 of the Recommendations in capitals should be identical to the authorized short name. It was felt that also for classes 2 to 9 the alternative names should appear in brackets.

10. The expert from the United States of America explained the need for marking and labelling packagings containing dangerous goods. After a detailed discussion in which all experts participated as well as the Chairman and some members of the Committee's editorial group, the Group of Experts agreed that it would be satisfactory if in future for class 1, the class, division and compatibility group letter, i.e. the full classification code, should appear on the label, preferably in the lower half.

11. In this connexion it was suggested that the secretariat be authorized to allocate United Nations serial numbers to new substances in the interim period between sessions of the Committee. However, it was felt that this procedure would impose an additional workload on the secretariat. The Group of Rapporteurs is invited to consider this proposal for classes other than class 1.

COMPLETION OF SYSTEM OF TEST PROCEDURES FOR DETERMINING THE ASSIGNMENT OF SUBSTANCES AND ARTICLES TO CLASS 1

12. The Chairman summarized the work done so far on this subject and pointed out that the Group of Experts should be able to complete its task in the near future.

13. It was felt that a set of test criteria and methods was needed for classifying articles and substances of class 1. Although a relatively strict procedure should be established, the experience of experts and testing laboratories should also be taken into consideration.

14. The expert from the Federal Republic of Germany mentioned problems that were encountered in connexion with the term "bulk transport". The experts from the United Kingdom, the United States of America and the Union of Soviet Socialist Republics explained their understanding of this term with regard to the transport of explosives substances without packagings.

15. The Group of Experts considered in detail the flow charts described in documents ST/SG/AC.10/C.1/R.42,-/R.47, and-/R.48, taking into account the work which had been done by the small group. This discussion resulted in agreement on a new flow chart which is presented in annex 3 to this report.

16. Afterwards the Group of Experts discussed briefly documents ST/SG/AC.10/C.1/R.35 (Canadian Thermal Stability Test) and-/R.44 (United Kingdom U-Tube Test). The Group of Experts agreed that these tests were examples of test series 2(c) and 2(e) respectively but took no decision relating to their suitability because of lack of information e.g. criteria.

17. It also took note of documents ST/SG/AC.10/C.1/R.50 submitted by the expert from the Federal Republic of Germany in which detailed technical data of the EXTEST standard detonator (blasting cap) were described and agreed that this detonator is an example for a standard detonator which may be used in relevant tests in the classification scheme.

18. The Group of Experts then discussed the tests listed in document ST/SG/AC.10/C.1/R.26, annex 2, and accepted some minor changes to the list. This resulted in rearrangement and renumbering of test series 1. The whole new list of tests is presented in annex 2 to this report.

19. The expert from the United States of America indicated that an informal meeting was planned in the United States of America for the spring of 1980, in order to further advance the work on test methods for explosives. The following matters will be considered at this meeting:

(a) Critical examination of the ability of the test methods shown in document ST/SG/AC.10/C.1/R.26, annex 2 to determine the specified parameters;

(b) preliminary consideration of criteria for acceptance/failure associated with each of the test methods listed;

(c) proof of the system of test procedures using test data for reference standards and substances already classified.

He extended an invitation to all interested members of the Group, or observers, to participate in this meeting.

CONFIRMATION OF THE VALIDITY OF THE SYSTEM OF TEST PROCEDURES BY EXCHANGING RESULTS OF TESTS PERFORMED ON THE BASIS OF THE REFERENCE STANDARDS

20. The Group of Experts had a preliminary discussion on the use of certain substances as reference standards for the various test methods and agreed to come back to this item after the work on test methods and flow charts had been finalized.

21. The expert from the United Kingdom agreed to prepare a paper for the next session.

INCORPORATION OF THE SYSTEM OF TEST PROCEDURES IN THE REVISED CHAPTER 4

22. The editorial group set up to consider revision of chapter 4 studied a number of amendments listed in documents ST/SG/AC.10/C.1/R.29, -/R.31, -/R.32 and -/R.40. The new text as approved by the Group of Experts is shown in annex 2 to this report.

23. The expert from the United States of America agreed to study further the problem of the correct classification for "Cartridges for Weapons" and submit a paper on this question if appropriate.

24. He also considered that the term "small arms ammunition with a bursting charge" which however, is contradictory, can be used in view of the relevant international convention on this subject.

25. On the proposal of the expert from Canada, the Group of Experts agreed to revise the descriptions of substances and articles shown in paragraph 4.68.

26. The expert from the Union of Soviet Socialist Republics suggested the cross-referencing of the entries in paragraph 4.68 with substances and articles in Chapter 2 and for listing in the index. Since this question requires further study the Group of Experts decided to return to this problem at a later session.

27. The amendments to chapter 4 as adopted by the Group of Experts are shown in annex 2 to this report.

28. The Group of Experts noted that document ST/SG/AC.10/C.1/R.8/Rev.1 superseded both documents ST/SG/AC.10/C.1/R.8 and ST/SG/AC.10/C.1/R.23. It further noted that outstanding editorial work on the revision of Chapter 4 would involve the inclusion of the two changes made by the Committee (ST/SG/AC.10/4/Add.1, (annex 4)), the annex of document ST/SG/AC.10/C.1/R.8/Rev.1, the finalized flow chart with ISO symbols and designation of tests, the additions to the glossary and the other changes which relate to Chapter 4 adopted by the Group of Experts during the nineteenth session.

29. The Group of Experts invited the Chairman and the expert from the Federal Republic of Germany to assist the secretariat in producing as soon as possible a complete draft text of Chapter 4 which would be issued for early study by the Group of Experts, with a view to its adoption at the twentieth session and submission to the Committee of Experts in 1980.

TREATMENT OF SUBSTANCES WITH EXPLOSIVE PROPERTIES BUT APPROPRIATE TO OTHER CLASSES

(a) Forbidden substances

30. The expert from the United Kingdom introduced a document concerning the development of a list of forbidden substances (ST/SG/AC.10/C.1/R.33). The Group of Experts had a preliminary discussion on the subject and the expert of the United States of America circulated a copy of a proposed national rule making. He also agreed to prepare a paper containing introductory points for such a list for the twentieth session.

(b) Other classes

31. The Group of Experts noted with interest document ST/SG/AC.10/C.1/R.34 submitted by the expert from Canada concerning the introduction of a new division 1.6 in class 1 and agreed to resume consideration of this subject at its next session.

32. The experts from the Union of Soviet Socialist Republics and Italy expressed general sympathy with the proposal and referred to safety aspects and possible implications for other regulations.

33. With regard to the classification of musk xylene, the expert from the United Kingdom introduced a proposal contained in document ST/SG/AC.10/C.1/R.41 Taking into account all previous data, and that in the recent bonfire test described in document ST/SG/AC.10/C.1/R.41, no explosion occurred, the Group of Experts finally agreed not to list this substance in class 1 but to submit it for consideration to the Rapporteurs at their next session in February 1980, for inclusion in Division 4.1 with a special provision relating to packaging.

ADDITIONS TO THE ENTRIES AND PACKING SHEETS FOR CLASS 1

34. The Group of Experts re-affirmed its position taken earlier in the session with regard to the use of proper shipping names and the enlargement of the Glossary.

35. For Barium azide, wetted United Nations No. 0224, the Group of Experts agreed to follow the same entry as for United Nations No. 1571 (see annex 1 to this report).

36. The Group of Experts adopted the proposal submitted by the expert from the United States of America (ST/SG/AC.10/C.1/R.27) to amend the present wording for compatibility groups B and D subject to a modification.

37. A proposal of the expert from Canada regarding alcoholic solutions of nitro-glycerine (ST/SG/AC.10/C.1/R.30) was not adopted. The expert from the Federal Republic of Germany agreed to circulate information on this subject and the expert from Canada offered to consider the preparation of a new document for the next session of this Group.

38. The expert from Canada introduced document ST/SG/AC.10/C.1/R.33 proposing to delete the use of secondary labels for explosive substances and articles. Although there was a certain agreement to restrict in general the use of secondary labels the Group of Experts did not accept this proposal and felt that the matter should be considered by the Group of Rapporteurs.

39. The expert from the Union of Soviet Socialist Republics underlined that explosives which are toxic due to their volatility should bear the poison label (Division 6.1).

40. Finally, the Group of Experts considered two proposals (ST/SG/AC.10/C.1/R.43 and R.49) submitted by the experts from the United Kingdom and the Federal Republic of Germany respectively. The new text as amended had been adopted by the Group of Experts and is shown in annex 1 to this report.

REVISION OF CHAPTER 10

41. For the consideration of this item, the Group of Experts had before it the following documents, parts of ST/SG/AC.10/C.1/R.29, -/R.36, a note on palletized loads circulated during the meeting by the expert from the United Kingdom and comments received from IMCO.

42. The expert from the Union of Soviet Socialist Republics informed the Group of Experts that during the discussion of document ST/SG/AC.10/R.30 in December 1978 certain proposals had not been considered fully by the Committee of Experts; the Group therefore agreed to have these proposals considered during the present session.

43. It was felt that most of these proposals were of an editorial nature and the secretariat was instructed to incorporate those relevant changes in the new version of chapter 10 (ST/SG/AC.10/4/Add.3, (annex 9)). The proposals of a more substantial nature which were adopted by the Group of Experts are shown in annex 4 to this report.

44. The Group of Experts also adopted the proposals submitted by the expert from the Federal Republic of Germany (ST/SG/AC.10/C.1/R.36) to include in packing method E 9(b) the use of plastics bags. See annex 4 to this report.

FORMULATION OF PROVISIONS FOR THE LOADING OF INTERMODAL CONTAINERS WITH SUBSTANCES AND ARTICLES OF CLASS 1, AND OF PROVISIONS GOVERNING THE CARRIAGE OF SUCH CONTAINERS

45. The Chairman explained the relevance of the International Convention for Safe Containers (CSC) and described the reaction of IMCO's CDG Sub-Committee in June 1979 when the United Kingdom preferred stringent conditions to be superimposed on the CSC requirements in the case of explosives goods (ST/SG/AC.10/C.1/R.45, paragraph 4 refers). The Group of Experts discussed document ST/SG/AC.10/C.1/R.39 by the United Kingdom and document ST/SG/AC.10/C.1/R.46 by the United States of America. Some experts considered the CSC performance standard for the construction of freight containers to be sufficient for any dangerous goods though recognising that special operating conditions might be imposed by national authorities. Other experts were hesitant to commit themselves at this time. The Group of Experts agreed to adopt a modified version of the proposal in document ST/SG/AC.10/C.1/R.46 as a basis for further study of the problem. The text is reproduced in annex 2 of this report.

FUTURE WORK

46. The Group of Experts was informed that its next session will be held tentatively from 4 to 8 August 1980.

ADOPTION OF THE REPORT

47. The Group of Experts adopted the report of its nineteenth session together with its annexes.

Annex 1

Chapter 2. LIST OF DANGEROUS GOODS MOST COMMONLY CARRIED

Amendments adopted at the ... of Experts

1. Addition of new entries

Substance or article		Hazards			Packing		Control temperature (°C)	Emergency temperature (°C)
Number	Name and description	Class division	Subsidiary risks	Special provisions	Group	Method		
0411	PENTAERYTHRITE TETRANITRATE (PETN) with, by weight, at least 7% wax	1.1 D	+	131		E 22(a)		
0412	CARTRIDGES FOR WEAPONS, with bursting charge	1.4 E	+			E 112		
0413	CARTRIDGES FOR WEAPONS, BLANK	1.2 C	+			E 112		
0414	CHARGES PROPELLING FOR CANNON	1.2 C	+			E 119		
0415	CHARGES PROPELLING FOR ROCKET MOTORS	1.2 C	-			E 22		
0416	CHARGES PROPELLING FOR ROCKET MOTORS, composite mixture	1.2 C	+			E 22		
0417	CARTRIDGES FOR WEAPONS, with INERT PROJECTILES	1.3 C	+			E 112		
0418	FLARES, SURFACE	1.1 G	+			E 133		
0419	FLARES, SURFACE	1.2 G	+			E 133		
0420	FLARES, AERIAL	1.1 G	+			E 133		
0421	FLARES, AERIAL	1.2 G	+			E 133		

I. Amendments

UN entry 0072:

for HEXOGENE read HEXOGEN

UN entry 0204:

for SOUNDING DEVICES, explosive read SOUNDING DEVICES, EXPLOSIVE

UN entry 0224:

Amend existing entry by read:

"BARIUM AZIDE, dry OR wetted with, by weight, less than 50 per cent water".

UN entry Nos. 0271, 0272, 0273 and 0274:

Amend packing method to read: "P 62"

UN entry 0323:

Delete synonym between brackets.

Chapter 3. SPECIAL PROVISIONS RELATING TO INDIVIDUAL SUBSTANCES AND ARTICLES

Add the following new special provision:

"131. The phlegmatized substance must be significantly less sensitive than dry PETN".

ANNEX 2

Chapter 4. SPECIAL RECOMMENDATIONS RELATING TO CLASS 1

Amendments adopted by the Group of Experts

Add a new sub-chapter:

"Carriage of explosives in freight containers"

preceding immediately the sub-chapter "Scheme of procedure whereby a product may be classed as an explosive and assigned a classification code" (page 133) and the following new paragraphs:

"4.12 Freight containers and transport vehicles should not be offered by a carrier or shipper for the carriage of explosives substances and articles of Class 1, unless the container or vehicle is structurally serviceable as witnessed by a current CSC approval plate (applicable to freight containers only) and a detailed visual examination as follows:

(a) Prior to loading a freight container or transport vehicle with explosives it should be checked to ensure it is free of any residue of previous cargo and to ensure it is structurally serviceable.

(b) Structurally serviceable means it cannot have major defects in its structural components; e.g. top and bottom side rails, top and bottom end rails, door sill and header, floor cross members, corner posts, and corner fittings in a freight container. Major defects are cuts or holes in the structural member greater than 10 mm in depth, regardless of length; cracks or breaks in structural members; more than one splice or improper splices (e.g. lapped splices) in top or bottom end rails or door headers or two splices in any one top or bottom side rail or any splice in a door sill; door hinges and hardware that are seized, twisted, broken, missing or otherwise inoperative; gaskets and seals that do not seat; and, for freight containers, any distortion of the over-all configuration great enough to prevent proper alignment of handling equipment, mounting and securing on chassis, rail car or truck, or insertion into ships' cells.

(c) In addition, deterioration in any component of the container or transport vehicle, regardless of the material of construction, such as rusted out metal in sidewalls or disintegrated fiberglass is unacceptable. Normal wear, however, including oxidation (rust), slight dents and scratches and other damage that does not affect serviceability or the weather-tight integrity of the units is acceptable.

4.13 All shipments of explosives of Division 1.1 and 1.2 should be accompanied by a statement, which may appear on the transport documentation, certifying that the transport unit is structurally serviceable as defined in paragraph 4.12 above."

Renumber paragraphs 4.12 to 4.68 as 4.14 to 4.70.

Paragraph 4.12 (d) (Renumbered as 4.14 (d))

Add and link to subparagraph 4.14 (d),

"A unit load consists of a number of suitable outer packages of compatible explosive substances or articles combined for ease of conveyance and is designed to be able to withstand the conditions associated with the appropriate modes of transport.

Such a unit load should be submitted to the classification procedure unless all the packages have an identical hazard classification code. The resultant hazard classification code should be applied to the unit load as a whole treating it as if it were a package for the purposes of marking and labelling in accordance with Chapter 13."

Paragraph 4.68 (Renumbered as 4.70)

Add the following new descriptions:

"Ammunition, practice

Practice ammunition does not carry the main bursting charge but will normally include a propelling charge, explosive train and small bursting charge."

"Ammunition, proof

This is ammunition used to test the performance or strength of new ammunition or weapon components or assemblies."

"Articles, explosive, n.o.s.

This category for articles, explosives not otherwise specified, should be used only when no other appropriate entry exists and, then only with the approval of the competent national authority."

Replace the three existing descriptions by:

"Articles, pyrophoric - Articles, which may contain both an explosive substance or component and a pyrophoric substance (one which is capable of spontaneous ignition when exposed to air). This definition is not intended to include articles containing white phosphorus.

Bombs, photo-flash - Explosive articles, dropped from aircraft to provide brief, intense illumination for photography.

Bursters - Cases charged with detonating or deflagrating explosive used to burst projectiles or bombs in order to project or disperse their contents. The burster is no larger than is required to burst the case and disseminate the contents."

Add the following new description:

"Bursting charge

An explosive charge designed to produce effect by blast or fragmentation."

Insert between "Bursting charge" and "cartridges":

Caps, percussion (see Primers, cap type)

Add the following new descriptions:

"Cartridges for weapons, blank

Consist of cartridge case with primer and propellant or black powder but no projectile. Used for training, saluting, propelling charge etc."

"Cartridges for weapons, with bursting charge (Group F)

These comprise a projectile with a bursting charge and a propelling charge, with means of initiation."

"Cartridges for weapons, with bursting charge (projectiles with propelling charge) (Group E)

These comprise a projectile with bursting charge and a propelling charge, without means of initiation."

"Cartridges for weapons, with inert projectile

These comprise a projectile without bursting charge but with a propelling charge and means of ignition."

Amend the following descriptions:

"Cartridges, oil well"

Read third sentence:

"Jet perforators and charges, shaped, commercial (see description)..."

"Cartridges, small arms"

Ninth line: for lacrymatory read lachrymatory

"Cartridges, starter, jet engine"

Last sentence should read: "See 'cartridges, power device'".

Add the following new descriptions:

"Charges, demolition

These consist of a secondary detonating explosive contained in a fibreboard, plastics, metal or other material casing."

"Charges, depth

These consist of secondary detonating explosive normally contained in a metal drum and are designed to detonate under water."

Amend the following descriptions:

"Charges, expelling, explosive, for fire extinguisher"

Last sentence should read: "See 'cartridges, power device'".

"Core, igniter"

First line, delete "quickly".

Add the following new descriptions:

"Cutters, cable, explosive

These consist of a device containing a knife-edged component which is propelled by a small charge of explosive."

"Expelling charge

An explosive charge designed to eject the payload from the parent article without damage."

"Flares, aerial

These are pyrotechnic devices which are dropped from aircraft and are designed to illuminate an area on the surface below."

Add the following new description:

"Flares, surface

These are pyrotechnic devices which are used to illuminate, identify, signal or warn."

Amend the following descriptions:

"Fracturing devices, for oil wells"

Second line: for round read around

"Fuse fuze"

Last line: for or fire or detonation read by deflagration or detonation

Add the following new descriptions:

"Grenades, hand or rifle

These are devices which are designed to be thrown by hand or to be projected by a rifle. Operational grenades contain a bursting charge.

Practice grenades contain the priming device and may contain a spotting charge."

"Mines, with bursting charge

These are normally metal or composition containers filled with a secondary detonating explosive, designed to be operated by the passage of ships, vehicles or personnel."

"Photo-flash powder in units

These consist of a pyrotechnic charge which, when ignited produces a light of sufficient intensity and duration for photographic purposes, or for stage effects."

Insert between "Primers for propelling charges" and "Projectiles":

Primers, tubular (see Primers for propelling charges)

Amend the following descriptions:

"Projectiles"

Ninth line: for terms read term

"Rocket motors"

Second line: for contained read contain

Add the following new descriptions:

"Rockets, with bursting charge

These consist of a rocket motor and an explosive warhead."

"Rockets, with inert head

These are fitted with motors which are normally ignited by electric primers or electric squibs."

Replacing existing description by:

Signal devices, hand - "Articles producing visual signals, including highway flares, small marine distress flares and railway fusees, containing pyrotechnic compositions and designed to signal or warn by means of flame, smoke, or a combination of both"."

Add the following new descriptions:

"Signals, ship distress

These contain pyrotechnic substances and are designed to produce signals by means of sound, flame or smoke or any combinations thereof. See also ammunition, illuminating."

"Signals, smoke, with explosive sound unit

These contain pyrotechnic substances which produce audible signals, in addition to coloured smoke signals."

"Substances, explosive, n.o.s.

It is intended that this category for substances, explosive, not otherwise specified should be used only when no other appropriate entry exists and, then, only with the approval of the competent national authority."

"Torpedoes, with bursting charge

These are devices containing a means of propulsion and a charge of secondary detonating explosive."

"Warheads, Rocket

An article containing secondary detonating explosives, designed to be fitted to a rocket. Guided-missile warheads are included in this description. Some warheads, rockets are fitted only with a burster or expelling charge."

Figure 4.1

Compatibility Group E, hazard division 1.4,

Insert entry "1.4 E"

Figure 4.2

Compatibility group B

Add at the end of the existing description:

"and not containing two or more independent safety features"

Compatibility group C

Delete "secondary" in the first line of the description.

Compatibility group D

Add at the end of the existing description:

"Articles containing a primary explosive substance and containing two or more separate safety features".

Annex 3

Chapter 4 - SPECIAL RECOMMENDATIONS RELATING TO CLASS 1

Flow Chart

The Group of Experts adopted the flow chart and the text reproduced below.

TESTS FOR CLASSIFICATION

Designation		Description of tests	Parameter or characteristic which is measured or determined	Examples of particular test apparatus or methods which are considered suitable (not exhaustive list)
Series	Type			
1 A	1 A(a)	A shock test with defined booster and confinement.	Propagation of detonation	BAM 50/60 steel tube test) instrumented TNO 50/70 steel tube test) for measuring United States gap test) the rate of) preparation
	1 A(b)	A combustion or thermal test	Thermal response	Koenen test United States internal ignition test United Kingdom time/pressure test United Kingdom sealed vessel test
	1 A(c)	A shock test without a booster	Power	Ballistic motor (Mark I, Mark III Trauzl test Extest) French CUP test
1 B	1 B(a)	A shock test with defined booster and confinement	Shock sensitivity	BAM 50/60 steel tube test) instrumented TNO 50/70 steel tube test) for measuring United States gap test) the rate of propagation
	1 B(b)	A combustion or thermal test	Thermal sensitivity	Koenen test United States internal ignition test United Kingdom time/pressure test United Kingdom small sealed vessel test
	1B(c)	Such other additional tests as may be required by the competent authorities		
2	2 (a)	An impact test	Sensitiveness to mechanical stimulus	United States Bureau of Explosives machine BAM machine United Kingdom Rotter test United Kingdom steel ball test

Designation		Description of tests	Parameter or characteristic which is measured or determined	Examples of particular test apparatus or methods which are considered suitable (not exhaustive list)
Series	Type			
	2 (b)	A friction test	Sensitiveness to mechanical stimulus	BAM machine United Kingdom "standard man" test United Kingdom PERME rotary friction machine
2	2 (c)	A stability test	Physical and chemical stability when subjected to thermal stimulus	Shell heat test United Nations test Differential thermal analysis (DTA) test Vacuum stability test
	2 (d)	A small scale fire test	Ease of DDT deflagration in small quantities when unconfined	United States small scale test United Kingdom Bickford fuse test
	2 (e)	An adiabatic compression test for liquids	Sensitiveness to pulsing or pumping action	United Kingdom "U" tube test
3	3 (a)	A shock test	Shock sensitivity of potentially Division 1.5 substances	Cap sensitivity test (United States or Federal Republic of Germany)
	3 (b)	A thermal test	Tendency for deflagration to detonation transition (DDT)	United States Deflagration to Detonation Transition test
	3 (c)	An external fire test	Tendency to ETC in fire	United Nations external fire test (bonfire test)

Remarks to the flow chart

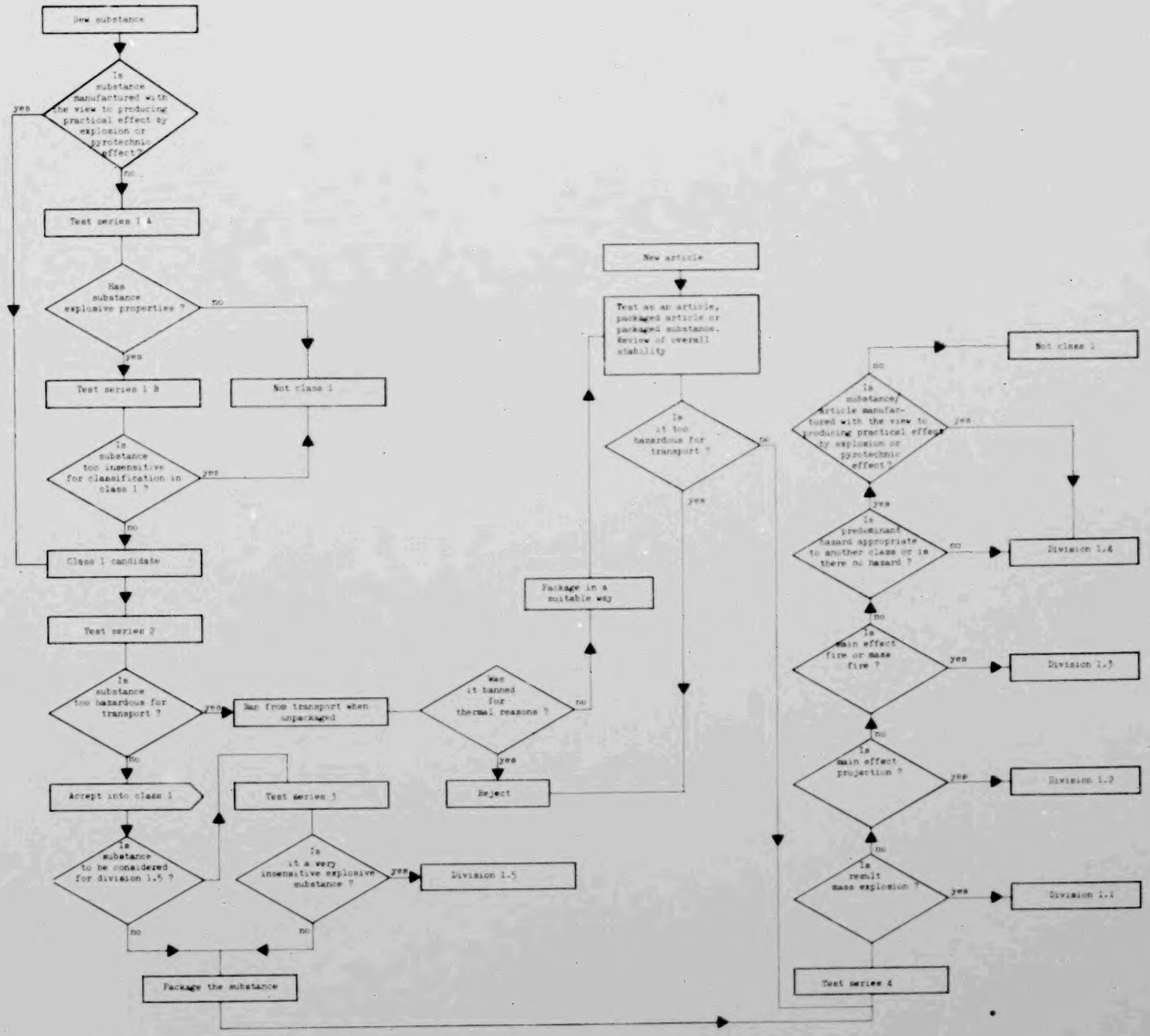
1. The flow chart is only for hazard classification.

   Before this classification, preliminary tests must be carried out to ensure adequate safety of personnel.

   The results of those tests could be used for the subsequent classification.

2. The flow chart is not specifically designed for the hazard classification of substances to be conveyed in bulk.

   Conveyance in bulk may require special tests which take into consideration the quantity (self-confinement) and kind of substance and the container for that substance. Such tests may be specified by the competent national authorities.


New substance
Is substance manufactured with the view to producing practical effect by explosion or pyrotechnic effect ?
yes
no
Test series 1 4
Has substance explosive properties ?
no
yes
Not class 1
Test series 1 B
Is substance too insensitive for classification in class 1 ?
yes
no
Class 1 candidate
Test series 2
Is substance too hazardous for transport ?
yes
Ban from transport when unpackaged
Was it banned for thermal reasons ?
no
yes
Reject
no
Accept into class 1
Test series 3
Is substance to be considered for division 1.5 ?
Is it a very insensitive explosive substance ?
yes
Division 1.5
no
no
Package the substance
New article
Test as an article, packaged article or packaged substance. Review of overall stability
Is it too hazardous for transport ?
no
yes
Package in a suitable way
Is substance/ article manufactured with the view to producing practical effect by explosion or pyrotechnic effect ?
yes
no
Not class 1
Is predominant hazard appropriate to another class or is there no hazard ?
no
Division 1.6
yes
Is main effect fire or mass fire ?
yes
Division 1.3
no
Is main effect projection ?
yes
Division 1.2
no
Is result mass explosion ?
yes
Division 1.1
no
Test series 4

Annex 4

Chapter 10. SPECIAL RECOMMENDATIONS ON PACKING FOR CLASS 1
(ST/SG/AC.10/4/Add.3)

Amendments adopted by the Group of Experts

Packing method E 2

Amend column 4 to read:

"1 for all substances,

2 for all except 0400"

Packing method E 9 (b)

becomes E 9

Add in column 3, under "plastics fabrics (5H1)"

"plastics film (5H2)"

Read text in parenthesis

"(If bags 5H1B, 5H1C or 5H2 are used no inner packaging is necessary)".

Packing method E 22 (a)

Add in column 4:

"5 and 11 for 0411"

Packing method E 23

Delete

Annex 5

INDEX

Amendments adopted by the Group of Experts on Explosives

1. New entries

Amorces (caps, igniting), see	1.4 G	0336
	1.4 S	0337
Cartridges*, actuating, for fire extinguisher or operating valve, explosive, see	1.2 C	0381
	1.3 C	0275
	1.4 C	0276
	1.4 S	0323
Bursting charge, see	(to be completed)	
CARTRIDGES FOR WEAPONS*, BLANK	1.2 C	0413
CARTRIDGES FOR WEAPONS*, with bursting charge	1.4 E	0412
CARTRIDGES FOR WEAPONS*, with INERT PROJECTILES	1.3 C	0417
Cartridges*, sporting, see	1.4 S	0014
Cartridges*, starter, jet engine, see	1.2 C	0381
	1.3 C	0275
	1.4 C	0276
	1.4 S	0323
Charges*, expelling, explosive, for fire extinguishers, see	1.2 C	0381
	1.3 C	0275
	1.4 C	0276
	1.4 S	0323
CHARGES*, PROPELLING, FOR CANNON	1.2 C	0414
CHARGES*, PROPELLING, FOR ROCKET MOTORS	1.2 C	0415
CHARGES*, PROPELLING, FOR ROCKET MOTORS composite mixture	1.2 C	0416

Expelling charge, see	(to be completed)	
FLARES, SURFACE	1.1 G	0418
	1.2 G	0419
FLARES, AERIAL	1.1 G	0420
	1.2 G	0421
PENTAERYTHRITE TETRANITRATE (PETN) with, by weight, at least 7% wax	1.1 D	0411
PETN, see	1.1 D	0411
Power* devices, explosive, see	1.2 C	0381
	1.3 C	0275
	1.4 C	0276
	1.4 S	0325

2. Amendments

Page 320, second column

"Ammonium nitrate explosives, see ...", add "1.5 D 0331"

Page 322, first column

"Ammunition SA"

for 1.4 C 0323 read 1.4 C 0339

Page 324, second column, third entry

Add to existing entry "Bangalore torpedoes", "1.1 D 0043"

Page 324, second column, seventh entry

Amend as:

BARIUM AZIDE, dry or wetted with, by weight, less than 50 per cent water	1.1 A	0224

Page 331, second column

"Cartridge cases, empty, primed, see ...."

Add: "1.4 C 0379"

Page 332, first column

"CASES, CARTRIDGES, EMPTY, WITH PRIMER"

for cartridges read cartridge

Page 336, first column

"CORD (FUSE), DETONATING, metal clad*, MILD EFFECT"

for 1.4 G 0104 read 1.4 D 0104

Page 347

for "GRENADES, hand or rifle, PRACTICE" read "GRENADES PRACTICE, hand or rifle"

Page 348, second column, first entry, delete:

"(Hexogen mixed with Trinitrotoluene and aluminium)"

Page 348, second column, third entry

for HEXOGENE read HEXOGEN

Page 368

"SIGNAL DEVICES, HAND*"

Add: "1.4 S 0373"

"SIGNALS, ship DISTRESS (other than water-activated contrivances)"

Add: "1.3 G 0195"